

Lab 5

In this task, you will design a system that reads a 4-bit binary number as input from switches and outputs the number with its complements' positions in a number vector (explained further in the report) and displays it on LEDs.

The system will mainly be implemented using software on the picoblaze microprocessor. The use of switches requires debouncing to avoid microswitch glitches. In this task, you will develop the debouncing operation in the microprocessor software.

System Design: List of components in the system:

1. Picoblaze microprocessor.
2. Memory (containing the assembly program).
3. 4-bit register switch: Reads the number as input and provides output to the PORT_IN of the picoblaze.
4. 4-bit register LEDs: Reads the PORT_OUT of the picoblaze and provides output to the LEDs.

Instructions: Hardware Instructions:

1. Implement the register as a generic component with a default size of 2.
2. Use the MHz100 clock for the microprocessor and registers.
3. Implement debouncing for the switches in the assembly program (see software instructions).
4. Use the reserved word "open" (see slide 5 in the ppt.structure.modeling presentation on the course website) for component connections when no output connection is required.

Software Instructions:

1. Write the software in the assembly language of the microprocessor, and name the file psm.asmb_5lab.
2. The goal of the software is to read the binary number from the register switch, perform debouncing, swap the positions of the bits with their complements (as per section 17), and write the new data as output to the LED register.